LARVAL DEVELOPMENT OF *VELACUMANTUS AUSTRALIS*.

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(Seven Text-figures.)

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Synopsis.

Eggs, 0·1 mm. in diameter, were laid in capsules in aquaria at 23·8° C. during February. They developed to produce trochophores in 24 hours and veligers in 48 hours; the veligers hatched out in 60 hours. Normal twin embryos as well as fragmentary exogastrulae were observed.

Velacumantus australis (Quoy and Gaimard) (*Pyrazus*) is one of the commonest molluscs on the shores of sheltered bays and estuaries from Queensland to Tasmania and south-west Australia. It is one of many organisms which constitute the association known as the Zosteretum (Hedley, 1915) based on dense beds of the marine grass *Zostera*. It is also well known as the carrier of the parasite responsible for schistosome dermatitis in humans (Pope, 1955). So far the eggs and early development of *V. australis* have not been described: in fact, Anderson (1960) cites only three descriptions within the entire family Cerithiidae (Lebour, 1945; Ostergaard, 1950; Thorson, 1946).

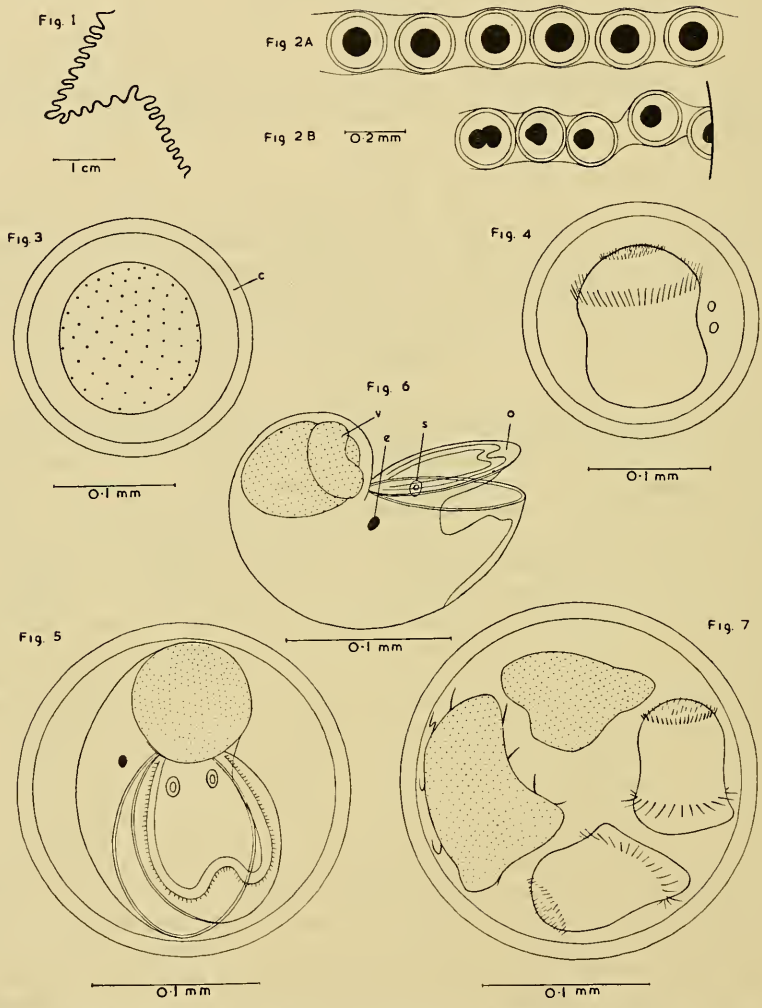
For two years a group of these snails was kept at this laboratory in glass aquaria with running sea-water; the abundant algal films on the aquarium walls served as food. In late February at a water temperature of 23·8° C. a group of adults averaging 3·4 cm. in length commenced laying egg strings on the glass walls of the tanks. The opaque white eggs had presumably been fertilized prior to laying, though the process of copulation was not observed. The eggs were enclosed in transparent gelatinous capsules within which larval development took place; they were arranged in a single series in a thin-walled, colourless tube and, in this respect, differed from the condition in other cerithiids where the eggs lie several deep across the width of the tube. The tube itself was cemented to the walls of the aquarium in the form of a wavy line, and it was noticed that although there was no shortage of space, the egg strings were always laid down in the same pattern of tight waves about 2 mm. wide (Fig. 1). This string would easily fit along a *Zostera* leaf which is assumed to be the normal site for egg laying.

Seven hours after laying, cleavages had developed in the eggs to produce an eight-celled blastula. Subsequently the smaller micromeres began to divide more rapidly and spread so that after eleven hours the few large macromeres were almost completely enveloped. The first larval phase, the trochophore, was complete in twenty-four hours: it had a crown of long cilia and an apical patch of smaller ones (Fig. 4). The polar bodies which had been extruded at first cleavage remained up to this stage, and adhered to the trochophore as it slowly rotated in its capsule. At forty-eight hours the final larva, the veliger, with its shell, operculum, eyes, and statocysts complete, was swimming rapidly round and round, but still within the confined space of the capsule (Fig. 5). The veligers hatched out sixty hours after laying (Fig. 6), whereupon they swam rapidly round the dish and crawled on the bottom, though it appeared that some time would elapse before they would cease to swim and finally settle.

Twin embryos were frequently observed developing within a single capsule. While it is not known how commonly this occurs in natural conditions, it was noted that the course of development was very plastic and could be altered by rough treatment and mechanical shocks or contamination with traces of alcohol. Mechanical disturbances could easily have caused separation of the first pair of cells which would then develop independently into twin larvae. Traces of ethyl alcohol profoundly affected the process of gastrulation to produce fragmentary exogastrulae which, being composed of more or less differentiated tissues, followed an erratic and incomplete development. Figure 7 shows the result when an egg first produced twin embryos, both of which subsequently

underwent exogastrulation and fragmentation to produce masses of densely yolked endodermal cells as well as ectodermal tissue fragments; these produced partial trochophore larvae in which the crown of larger cilia had slipped to become a belt.

The hardiness, abundance, and wide distribution of this species, together with the plasticity of its development, make it a useful animal for laboratory studies in cytology and embryology.



Figs 1-7.—1. Egg-string of *Velacumantus australis*. 2A. Eggs in capsules within egg-string. 2B. Embryos in capsules within egg-string. 3. Egg in capsule, *c*. gelatinous capsule. 4. Trochophore stage in capsule at 24 hours. 5. Veliger stage in capsule at 48 hours. 6. Hatched veliger partially open at 60 hours, *e*. eye, *o*. operculum, *s*. statocyst, *v*. visceral mass. 7. Fragmentary larvae.

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